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Instruction to Authors
Editorial

Pakistan is long been an area of dynamic development in plastic surgery, adapting to differing cultures, traditions, and medical and surgical philosophies. Recently, these changes have been even more striking and rapid. Microsurgery, tissue expansion, craniofacial surgery, and the spin-offs of these techniques have made permanent changes in trauma, the treatment of malignancy, and aesthetic surgery.

The "Pakistan journal of plastic surgery" creates a focal point for discussion of advances in clinical technique and in research, in Pakistan and worldwide. Topics include plastic and reconstructive surgery, head and neck surgery, aesthetic and craniofacial surgery, microsurgery, trauma, and burn management.

Pakistan journal of plastic surgery provides a forum for original articles advancing the art of plastic surgery. Many describe surgical craftsmanship; others deal with complications in surgical procedures and methods by which to treat or avoid them. Coverage includes "second thoughts" on established techniques, which might be abandoned, modified, or improved. Also included are case histories; improvements in surgical instruments, pharmaceuticals, and operating room equipment; and discussions of problems such as the role of psychosocial factors in the doctor-patient and the patient-public interrelationships.

Perhaps most important is the discussion of the role of reconstructive plastic surgery as the final step in the rehabilitation of patients undergoing long-standing and tedious reconstructive surgery for the repair of congenital, acquired, accidental, and neoplastic defects.

I was given the task to print this journal this year, I have tried to fulfill the responsibility by printing this journal. I will try my level best to continue printing quarterly issues by the help, support and contribution from my colleagues.

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Total Heel Reconstruction With Sural Fasciomyocutaneous Flap: Indications And Limitations

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Disclosure: The authors have no financial interests or conflicts of interests in any of the techniques mentioned in this article.

ABSTRACT
Background: Complete loss of soft tissue of the heel presents great challenge to the reconstructive surgeon because of limited options for reconstruction. Reverse sural flap can be utilized to achieve the goals of heel reconstruction but it is not considered as the first option for coverage of heel defects because it is insensate. Nevertheless, the high sural or fasciomyocutaneous variety of sural flap not only provides coverage to the heel, it can simultaneously cover the Achilles tendon as well.
Methods: Soft tissue defects of heel as a result of different aetiologies were included in the study. Patient demographics, co-morbidities, survival of flaps and complications were noted.
Results: Over a period of seven years (July 2003 to June 2010), heel reconstruction with sural fasciomyocutaneous flap was performed on 46 patients. There age ranged from 12 to 65 years. Out of 46 flaps, 43 survived completely, 3 flaps had partial necrosis. Long term follow up showed stable wound coverage in majority of the patients.
Conclusion: The sural fasciomyocutaneous flap should be considered as one of the options for heel reconstruction in patients where sensate flaps are not available.

Key Words: Heel reconstruction, sural flap, sural fasciomyocutaneous flap.

INTRODUCTION
The loss of soft tissue at the level of the heel, with the exposure of tendon or bone, represents a challenging reconstructive problem because of the lack of locally available tissue, relatively poor circulation of the skin, and weight-bearing requirement of the region. Therapeutic options include local, regional, and free flaps. A local flap as a surgical solution may not be possible either because of inadequate tissue available to be moved from areas adjacent to the defect or because of limited flap mobilization. Reversed septocutaneous flaps such as the peroneal artery flap, anterior tibial artery flap, and posterior tibial artery flap are other options. When using such flaps, however, a major artery is sacrificed and an already injured lower leg might be jeopardized. Microsurgery can be used to remedy these problems, but such a technique requires a microvascular surgical team and appropriate equipment. The ideal flap for heel reconstruction must be sensate and durable to withstand the stress and trauma that occurs during walking and running. Sensate medial plantar artery flap meets most of the requirements of stable heel reconstruction but its limitations include small size and availability in cases of severely traumatized foot.

LeFourn et al. first described the concept of the distally based neurocutaneous island flap supplied by the vascular axis around the sural nerve, similar flaps have been reported subsequently and shown to be appropriate for the reconstruction of medium-to-large defects of the ankle and heel. In most of these reports, attention was focused only on the accompanying arteries of the sural nerve. Reverse sural flap has been established as a workhorse flap for lower leg and foot reconstruction.

LeFourn et al. in 2001 described the technique of including a midline “groove muscle cuff” around the interastocnemius sural nerve. This modification allows the elevation of flap from the upper part of the calf increasing the size of flap to cover large defects of the lower limb. The inclusion of perforators from the gastrocnemius muscle improves the reliability of the flap making it one of the most versatile flaps of lower limb. This large sized flap with a portion of gastrocnemius muscle can be used to reconstruct the heel. With some limitations, this flap can not only provide total heel coverage but can

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simultaneously cover the Achilles tendon as well.

MATERIALS AND METHODS
This study was carried out at the Department of Plastic & Reconstructive Surgery, Shaikh Zayed Hospital, Lahore. A total of 46 patients with soft tissue loss of heel area were included in the study over a period of 7 years. Patients with trauma to posterior aspect of leg or non-salvagable limbs were excluded from the study. The patients were managed with distally based sural fasciomyocutaneous flap. In patients with associated co-morbidities like age > 55 years, history of Diabetes Mellitus or venous insufficiency, the flap was delayed for a period of 14 days. After 2 weeks, the flap was transferred to the defect. Post-operatively, patients were instructed to wear special foot ware in order to apply uniform pressure over the heel area. They were also counseled regarding the insensate nature of the flap and its implications to avoid pressure related delayed complications. Patients were followed up at 6 weeks, 3 months, and then yearly for five years and any complications occurring during that period were noted.

RESULTS
Out of the total of 46 patients, there were 29 males and 15 females. Their age ranged from 12 to 64 years, while the mean age was 27 years. The average size of the flap was 16x8 cm. The number of flaps performed was 46, out of which 43 survived completely and three flaps suffered partial (marginal) necrosis. The delay principle was applied in 19 patients. The reason for delay was diabetes mellitus in 11 patients, venous insufficiency in three and large size of flap in five patients. There was no complete necrosis. Paresthesia of the lateral border of the foot was reported by 13 patients at 6 months post-operatively, while only 3 patients complained of reduced sensations on the lateral border of the foot one year after the surgery. Follow up ranged from 6 weeks to 5 years. Follow up of three years or more was carried out on 18 patients. Long term complications included ulceration of the flap in 2 patients. These were managed conservatively with local wound care.

Examples of heel reconstruction are shown in Figures 1 and 2.

DISCUSSION
Defects of the heel have been difficult to cover especially combined injuries involving the weight bearing part of the heel as well as the posterior heel area including the Achilles tendon require a well vascularised reconstruction having a good durability and sensation because of its location and repeated friction by footwear. There are many possible reconstructive options for this region, including skin grafts, local flaps and distant flaps. Lateral calcaneal artery flap

originally described by Grabb and Argenta in 1981 is an axial pattern fasciocutaneous flap that is simple, stable and sensate. It is preferred in small sized isolated posterior heel defects with exposed Tendo Achilles or Calcaneum and normal skin in flap vicinity. Its main limitation is size of the flap and an unsightly donor site which precludes its usage for large defects of the heel area. Medial plantar flaps are fasciocutaneous flaps from the non-weight-bearing instep area. They can be raised as pedicled flaps, cross-foot flaps, or free flaps, and include the same anatomical features that are unique to the plantar skin, namely a thin layer of subcutaneous fat and dense fibrous septae anchoring the skin to the underlying fascia. Although instep flaps are regarded as the first choice for heel reconstruction, their use is limited by the size of the defect, the severity of prior trauma and peripheral vascular disease. In addition, sensation of the toes may be diminished due to neuropraxia. When defects of the plantar foot are larger than 100 cm² in size or are associated with injury and chronic infection of the underlying musculoskeletal structures, skin grafted muscle, musculocutaneous flaps and distant skin free flaps can be considered for the reconstruction of the heel. Muscle flaps are favoured for deep irregular defects, especially after bony debridement, because of their ability to fill dead space. They may be superior to fasciocutaneous flaps in the presence of chronic infection and osteomyelitis. Protective sensation is important for flap durability in weight-bearing areas and has been reported repeatedly in muscle flaps and
fasciocutaneous flaps alike. Muscle free flaps, however, are limited by functional impairment. Distant fasciocutaneous flaps may leave unsightly scars or contour deformities. Masquelet et al. are credited to introduce and describe the neurofasciocutaneous flap and its relationship to the sural nerve in the posterior compartment of the leg. Hasegawa et al. in 1994 raised the sural flap based on the lowermost septocutaneous perforator from the peroneal artery arising from posterolateral septum 5 cm above the tip of lateral malleolus.

In 1996, Rajacic N et al. covered the wounds of lower leg and foot in 21 patients with sural flap and claimed that this flap can reach the dorsum of foot distally and up to the middle third of Tibia proximally. Jeng and Wei in 1997, used variants of distally based sural island flap. They successfully treated 19 patients with fasciocutaneous, adipofascial and flaps based on lateral cutaneous nerve for foot and ankle reconstructions.

Al Qattan and LeFourn et al. in 2001 described the technique of including a midline “groove muscle cuff” around the intergastrocnemius sural nerve. This “mesentery” can preserve the blood supply continuity from the sural neurovascular axis and the perforators of the gastrocnemius muscle over the calf region. The original goal of this technique was to improve the flap’s arterial supply and venous drainage. As this flap includes high metabolic muscle component, Chen et al. successfully used this fasciomyocutaneous flap to treat chronic calcaneal osteomyelitis in 11 diabetic patients by inserting the muscle component into the bone defect. Ranjendra Prasad et al. in 2002 conducted an anatomic study to delineate the vascular connections of the arteries around the sural nerve. Recently, Chang et al. conducted an anatomic study on the vascular communication between the suprafascial sural neurovascular axis and deep gastrocnemius muscle and concluded that inclusion of muscle cuff improves the flexibility and versatility of the flap.

The present study presents a wide range of age of patients (12 to 65 years). The average age is 27 years, because majority of the patient population comprised of young individuals having wounds as a result of trauma. Mean age in the present study is comparable to Hassanpour and colleagues (25 years), and Akhtar S et al. (31.5 years) as these studies report on similar patient population, while mean age is higher in studies conducted by Chang et al. (45 years) and Rashid M et al. (40 years). Literature shows that increasing age and co-morbidities increase the chances of failure of flap.

The average size of the flap in the present study is 16x8 cm. Although case reports of large sized flaps have been reported by some authors, Larry Hollier et al. reported an average size of 8.3x6 cm while it was 8.7x7 cm in the study conducted by Rashid M et al. and 10x8 cm in the large case series of Akhtar S et al. The largest sural flap (17x16 cm) was raised by Ayppan and Chadha, but this study comprised of 5 patients only and delay principle was applied to all large sized flaps. The safe limits of largest flap are not clearly mentioned in literature simply because of the great variation in the size of the calf of different individuals. We propose that the upper and middle third of the calf can be raised safely on the reverse sural pedicle, but when raising very large size flaps (relative to the size of leg), application of delay principle maximizes the chances of success.

More important than size of the flap is the issue of safe proximal limit of the distally based flap as this is the factor directly affecting the size of flap as well as its arc of rotation. Chen et al. suggested the upper margin of the flap not cross over 6 cm from the popliteal crease as they found necrosis of the distal margin of flap in the more proximally raised flaps. Hassanpour et al. kept the proximal border at 1.5 to 4 cm distal to the popliteal crease. The sural nerve is formed in the middle third of the leg by the union of the median and lateral sural cutaneous nerves, which are branches of tibial and common peroneal nerves, respectively. The origin of median sural cutaneous nerve is quite variable but usually it arises in the middle of the popliteal fossa.

Considering the above mentioned anatomic facts, it may be suggested that the proximal border of the flap should be lower than popliteal crease.
This level can also be modified depending upon the size of the leg which is proportional to the height of the patient. We mark 6 cm from the popliteal crease as the upper limit of the flap in adults and 3 cm from the popliteal crease in children and suggest that variations can be made according to the surgeon's individual experience as well.

Survival of the flap is a major determinant of success of any reconstruction of the lower limb in which flap is used. Regarding the survival of flaps in the present study, 93% flaps survived completely, partial necrosis occurred in 7% patients while there was no complete necrosis. Hassanpour et al.\textsuperscript{28} carried out 28 high sural flaps out of which 27(96%) survived completely, while Fraccalvieri et al.\textsuperscript{29} carried out 33 reverse sural flaps with 94% complete success rate. The reason for high rate of success is that both of these studies comprised of young post traumatic patients who generally don't develop complications. Case series reporting on old patients or patients with co-morbidities like the one conducted by Baumeister et al.\textsuperscript{30} or Parrett et al.\textsuperscript{31} show increased complications rates with low rates of complete survival of reverse sural flaps.

In the past, reverse sural flap has been considered as unreliable in patients with comorbidities. The landmark study conducted by Baumeister et al.\textsuperscript{30} on 70 multimorbid patients showed a 59% complication rate. Similarly, Akhtar and Hameed questioned the reliability of reverse sural flaps in multimorbid patients. Baumeister et al.\textsuperscript{30} called Diabetes Mellitus, arterial insufficiency and venous impairment as 'Unhappy triad' and proposed that reverse sural flap should be considered with caution in such patients. Nevertheless, on careful analysis of the results of that study, it becomes evident that they were able to achieve closure in 60 patients and declared the overall success of their study to be 86%. This patient population is vulnerable to complications irrespective of reconstructive procedure attempted. To improve the success rate of sural flap in patients with co-morbidities, various measures have been suggested. We propose that sural flap should always be delayed in patients with age >50 years, history of diabetes mellitus and peripheral vascular disease in order to avoid failure of the flap.

The main criticism of the reverse sural flap for heel reconstruction is its lack of sensation which makes the flap more prone to trauma as result of repeated weight bearing and friction of the footwear. We do not consider the sural flap as the first option for heel reconstruction or this flap being equivalent to other sensate flaps like medial plantar flap, but we propose that this flap should be considered as an option in patients in which Medial Plantar flap is not possible or is inadequate or in centers where microsurgical facilities are not available. In such situations, counseling of the patient regarding avoidance of persistant pressure, use of special footwear and proper care of the flap may help the patient to avoid ulceration of the flap. Moreover, the presence of gastrocnemius muscle cuff may increase the durability of the flap and its ability to resist pressure necrosis of the flap in the long term.

CONCLUSION

With some limitations, sural fasciomyocutaneous flap can provide durable coverage to the heel and Achilles tendon area and constitutes an important place in the armamentarium of plastic surgeons to deal with foot defects.
References


7. Al-Qattan MM. A modified technique for harvesting the reverse sural artery flap from the upper part of the leg: inclusion of gastrocnemius muscle cuff around the sural pedicle. Ann Plast Surg 2001;47:269-78.


Fig 1.a – A large wound on the right heel as a result of severe trauma to the foot and Tendo Achilles area.

Fig 1.b – Harvesting of a 16x10 cm large sural fasciomyocutaneous flap.

Fig 1.c – Post operative result 3 years after surgery (patient ambulatory).

Fig 2.a – Post traumatic heel pad loss with exposed bone and plantar fascia.

Fig 2.b – Post operative result 2 years after reconstruction.
Penile reconstruction in severe penile injury: Phalloplasty with an island anterolateral thigh flap (ALTF).

Dr. Muhammad Mughese Amin, Dr. Latif Javed, Dr. Muhammad Sajid

ABSTRACT
INTRODUCTION: Penile amputation is common in our society due to trauma by patta injury or electric burn injury. Phallic reconstruction to treat this devastating condition is a major challenge to the reconstructive surgeon. Each surgeon’s contribution is an important entry in the menu of surgical alternatives available to the phalloplasty surgeons. We used an island anterolateral thigh flap(ALTF) for phallic reconstruction.

PATIENTS AND METHODS: This study included 12 patients admitted to Plastic & Reconstructive Surgery Unit Bahawal Victoria hospital Bahawalpur from November 2008 to June 2011. Their ages ranged from 16-43 years with mean of 29 years. All the patients were presented by post-traumatic total or subtotal amputation of the penis. All the patients were treated with phallic reconstruction by using island anterolateral thigh flap(ALTF). Aesthetic and functional results were evaluated.

RESULTS: Complete necrosis of the flap was not recorded. Partial necrosis of the distal end of the flap was found in two cases which healed completely with conservative measures. In the remaining cases, the post operative course was uneventful. The patient’s satisfaction with the final result was acceptable in all the cases. Regular sexual activity and performance was good in the patients where bone graft was used & acceptable in other cases.

CONCLUSION: An island anterolateral lateral thigh flap (ALTF) is a very good option for phalloplasty.

Keywords: Penile reconstruction, Alt flap, Single stage reconstruction.

INTRODUCTION
An absent or inadequate penis is a devastating condition with significant psychological and physical impact. Although uncommon, it is a challenging condition to treat. Surgery to find a solution to the problem of “no penis” falls into two broad divisions. Procedures that utilize existing tissue and those that bring in new tissue. Phalloplasty utilizing distant tissue transfer has been accomplished via various techniques. Each surgeon’s contribution is an important entry in the “menu” of surgical alternatives available to phalloplasty surgeons [1].

Historically the tube pedicle was used for penile reconstruction [2-5]. Song [6,7] has reported one-stage phalloplasty using low abdominal flaps, scrotal flaps, thigh flaps and costal cartilage. The concept of forming a urethra with less tendency for contraction from split-thickness skin grafts on the deep superficial (Scarpa’s) fascia of the groin flap had been contributed [8]. Mukherjee has used a seven-stage procedure utilizing groin and scrotal flaps for reconstructive phalloplasty in male burn victims with a great successful results [9].

One-stage phalloplasty had been reported in female to male transsexuals with a modified Chinese forearm flap, including the cutaneous nerves anastomosed to the genital branches of the ilioinguinal and iliohypogastric nerves and the perineal branches of the pudendal nerve to obtain true genital sensibility[10]. The lateral groin flap in combination with vascularized iliac crest bone graft had been used successfully [11,12]. In their phalloplasty series, phallus had been reconstructed in one-stage using a large radial forearm sensate flap to from the entire penis. They have used a costal cartilage graft as a stiffener [13,14].

The ideal requirements for free flap phalloplasty should include the following: one-stage procedure, creation of a competent neo-urethra to allow for voiding while standing, return of both tactile and erogenous sensibility, enough bulk to tolerate the insertion of a prosthetic stiffener, acceptable aesthetic result to the patient,


minimal scarring or disfigurement with no functional loss in the donor site [15]. Gilbert et al. have used a one-stage phalloplasty utilizing two arterialized flaps. The lateral brachial fasciocutaneous free flap which forms the surface of the penis is based on the radial collateral artery and includes the lateral brachial cutaneous nerves. This method fabricates the urethra from an inferior rectus abdominis musculocutaneous island flap. No skin grafting was required [16,17]. Akoz et al. have used an iliac osteocutaneous flap for phalloplasty and a vascularized bone flap for imitating penile erection. Long-term results are promising in adults [18]. Free radial forearm osteocutaneous flap had been used in twenty two female to male transsexuals patients with promising results [19]. De Fontaine et al. have used free radial forearm flap in cases of micropenis associated with vesical extrophy for penile reconstruction [20].

The (ALTF) flap had been used over 20 years for reconstruction of various simple and complex soft tissue defects in very difficult anatomic regions. The lateral circumflex femoral system is considered as a super-ideal pedicle for a very versatile (ALTF) flap. Its descending branch represent the vascular pedicle of the ALTF. It gives during its course muscular branches to the surrounding muscles and cutaneous branches to the anterolateral aspect of the thigh. The perforating vessels of this flap took their origin from the main trunk and reach the skin via musculocutaneous route or septocutaneous one [21]. Song et al. had introduced the free anterolateral thigh flap (ALTF) as a new flap concept based on the septocutaneous artery[22].

The different cosmetic and functional requirements for penile reconstruction are well known as follows. (i) The aesthetic appearance of the neophallus must be as normal as possible. (ii) The penile shaft must contain a urethra to allow voiding in a standing position and with a normal stream. (iii) The penile shaft must allow the implantation of a penile stiffener in order to allow intercourse. (iv) Morbidity of the donor area must be minimal with an easily concealed scar. Although phallic reconstruction is a complex surgical procedure, it is nowadays possible to fulfill most of the above-mentioned requirements using the new techniques developed in plastic and reconstructive surgery [23].

The anterolateral thigh flap (ALTF) has been used either as local island or free flap to reconstruct different soft tissue defects in various sites in the body. The elevation and dissection of this flap needs experience and good knowledge of its anatomy. The vast experience of our team in the elevation of this flap encouraged us to use it for phalloplasty.

PATIENTS AND METHODS

This study included 12 patients admitted to Plastic & Reconstructive Surgery Unit Bahawal Victoria hospital Bahawalpur from November 2008 to June 2011. Their ages ranged from 16-43 years with mean of 29 years. All the patients were presented by post-traumatic total or subtotal amputation of the penis (fig-1).

During preoperative explanation of the various options of phalloplasty, we stressed that the mostly used flap in our unit is the radial forearm flap. The patients asked us if it was possible to avoid scars in their forearms. So we proposed the use of anterolateral thigh flap (ALTF) as an island one to construct the phallus and the patients agreed on that proposal. All patients were operated under general anaesthesia. The flap size ranged from 10 x 7 cm to 16 x 12 cm. In all the cases neo-urethra formation was done where an island was made on the flap by de-epithelization of strip 1 cm wide.

Flap design:

The site of the cutaneous perforator of the descending branch of the lateral circumflex femoral artery was marked 2 cm above the middle of a line joining the anterior superior iliac spine and the lateral aspect of the patella by using handheld Doppler . The flap was designed around this point and its size ranged between 10x7 cm to 16x12 cm on the anterolateral aspect of the thigh. Preoperative photography documented the preoperative status and design of the flap (Fig. 3).
Operative technique:
Under general anaesthesia in twelve patients the preparation and draping was done. The medial margin of the flap was incised first. The incision was made down through the deep fascia and also includes the epimysium of the rectus femoris muscle. The edges of the deep fascia and epimysium were secured to the subdermal tissue between the deep fascia and subcutaneous fat. The flap was then underminded and raised laterally with sharp dissection towards the intermuscular septum between the rectus femoris and vastus lateralis muscles. Two musculocutaneous perforating vessels were found at the site that was marked preoperatively in eight cases. Dissection of them was done carefully and both musculocutaneous perforators were skeletonized without taking muscle cuff around them. In the other four cases single septocutaneous perforating vessel was found in the septum between vastus lateralis and rectus femoris muscles. Dissection was then continued upward following the descending branch of the lateral circumflex femoral vessels till its origin from the profunda femoris vessels. Harvesting the lateral cutaneous nerve of the thigh was done for its microneuro anastomosis with the dorsal cutaneous nerve of the penis.
Fashioning of the new phallus, formation of new urethra, anastomosis of neo-urethra to the urethral stump & fixation of the neo-phallus with penile stump was done in single stage in all the cases. Closure of the donor site was done with split thickness skin graft. Postoperative treatment included antibiotics, analgesics and vitamins.

of post-traumatic amputation of the penis. Their ages ranged between 16-43 years with a mean of 29 years. All patients were operated on under general anaesthesia. The flap size ranged between 10 x 7 to 16 x 12 cm. The pedicle length was 11-15 cm with a mean of 13.4 cm. The operative time was 3-4 hours with a mean of 3.15 hours. In all the cases the distal end of the flap was fixed to the penile stump. The pedicle was severed two weeks later. In this series, insertion of bone graft as stiffener was done in eight cases 6 months after complete healing. Five of them were already married. Six months after insertion of the bone graft as stiffener, they have enough rigidity for practicing normal sexual activity with good performance.
Complete necrosis of the flap was not recorded. Partial necrosis of the distal end of the flap was found in two cases which healed completely with conservative measures. In the remaining cases the post operative course was uneventful. In the post-traumatic cases impaired sensation of the reconstructed phallus was persistent for 9 months and gradually regained with medical treatment one year postoperatively. The patient’s satisfaction with the final result was acceptable in all the cases (Figs. 5,7). Regular sexual activity and performance was very good in the patients where bone graft was used. It is not yet evaluated in the other cases. In the post-traumatic partial loss of the penis regular sexual activity was delayed up to 12 months postoperatively as a result of decreased skin sensation of the reconstructed phallus and psychological upset of the previous trauma.

RESULTS
This study was carried out on twelve patients in the period between November 2008 and June 2011 with a follow-up period that ranged from 4 months to 24 months. All the patients were
Fig 1: Photograph showing traumatic penile amputation.

Fig 2: After healing of stump.

Fig 3: Photograph showing flap design.

Fig 4: Early postoperative results with grafted donor area.

Fig 5: Late postoperative photograph showing

Fig 6: Reconstructed phallus during voiding reconstructed phallus with good results.

Fig 7: Reconstruction of phallus after subtotal traumatic penile amputation with very good results.
DISCUSSION

There is no doubt that the radial forearm flap is considered the standard flap for phalloplasty all over the world. It gives long, sensate phallus with average size and shape with very low failure rate. We have used it in more than 07 cases of phalloplasty in patients at different age groups. Although we were faced with the most famous drawbacks of this flap as donor site unacceptable scar, tendon exposure and urethral problems, the final results were acceptable to a great extent. Free radial forearm flap provides a promising choice for phalloplasty with an excellent result. It considered by many surgeons as a gold standard for penile reconstruction [19, 20, 24, 25]. Urethral complications represent the most frequent complication in free radial forearm flap. In our unit urethrocuteaneous fistula was recorded in 54% of cases. In Fang et al. [26] phalloplasty series (56 cases), the urethrocuteaneous fistula rate was 38/56 (67.8%). Fang et al. [19] reported 40.9% urethrocuteaneous fistula in their transsexual series. However, Perovic recorded the best result of this complication 2/24 (8.3%) in his series of phalloplasty in children and adolescent with extended pedicle island flap[27].

Five major disadvantages of the radial forearm flap were recorded [28]. They include tightness of the forearm skin graft, potential loss of the wrist extension, loss of tactile forearm skin and loss of radial artery coupled with the significant aesthetic disadvantages of the grafted donor site. Weinzweg and Dave[29] summarized these disadvantages in unsightly donor site scar especially in young female and skin graft breakdown with tendon exposure. Fang et al. [19] added radius bone fracture as one of the disadvantages of the radial forearm osteocutaneous flap for phalloplasty for female to male transsexuals.

The disadvantages of the donor site of the forearm flap has led to the search for other donor sites. The vast experience of our team in the elevation and dissection of the ALTF encouraged us to use it as an alternative to radial forearm flap for phalloplasty. In our series the age group ranged between 16-43 years with a mean of 18.2 years. Gilbert et al. [30] have done their series (11 patients) of phallic construction in prepubertal and adolescent boys. The age ranged between 12-18 years in Perovic Series [27]. However, in traumatic series (7 children) of ochoa [31] the age group ranged between 4 months to 8 years and 5 patients were younger than one year.

In our study the indication for phalloplasty was post traumatic subtotal or total amputation of the penis. Traumatic amputation whether subtotal or total was the main indication [30-33].

In our study, the flap size ranged between 10x7 cm to 16x12 cm and it proportionate to the patient body built and age. In the study by Zayed E. et al.[1], the flap size ranged between 12x8 cm to 18x13 cm. Sun and Huang [17] reported one stage reconstruction of the penis with composite iliac crest and lateral groin skin flap. The flap size was 11 cm long and 10 cm wide. The flap size depends on the patient built as reported in Perovic series [27].

In our cases, total loss of the island ALTF was not reported as a result of using an island flap with its wide safety profile, absence of the risks of micro-anastomosis and thrombus formation. However, partial loss of the distal end of two flaps was recorded and healed completely conservatively. Single case of total loss out of 56 cases of the free radial forearm flap had been recorded [26]. However, partial flap necrosis were reported in two cases [27] and in one case [1, 19].

In our study, insertion of bone graft as stiffener was done in eight cases. It was sufficient for obtaining rigidity in the reconstructed phallus. After insertion of the bone graft as stiffener they have enough rigidity for practicing normal sexual activity with good performance. Zayed E et al. used silicon implant as penile stiffener[1]. Composite iliac crest to provide rigid support with lateral groin skin flap have been used [11]. The osteocutaneous skin flap have been used sexual penetration have been also used [24]. Vascularized iliac bone had been used with good result for sufficient rigidity for a neophallus [18].

In the post-traumatic partial loss of the penis regular sexual activity was delayed up to 12 months postoperatively as a result of decrease skin sensation of the reconstructed phallus and
bad memory of the previous trauma. No penile fracture had been recorded in the eight cases that have regular sexual activities [19]. The sexual performance on regular basis was rated as highly satisfactory [19,20].

The island anterolateral thigh flap “ALTF” is an option for phalloplasty[1]. It has the following advantages. Flap elevation is both easy and safe, the vascular pedicle is long enough to facilitate its transport to the proper site, the operative time is not long as free flap and with a mean 3.15 hour this series. The flap is potentially sensate one which is an important feature in phalloplasty. There possible side effects and the postoperative course is uneventful in most cases. The skin territory of this flap is very wide and a large phallus can be constructed from the anterolateral aspect of the thigh. Finally the donor site is completely concealed and has a lower rate of complications. The disadvantages of this flap are: the constructed phallus is thick and it was difficult to construct the urethra by folding of this flap. The thickness and difficulty increase in obese patients. A trial of thinning of this flap is going on cautiously.

Conclusion:

The island anterolateral thigh flap(ALTF) is very a good option for phallus reconstruction especially when the radial forearm flap is not available or not accepted by the patient.

REFERENCES
14. Daverio P.: One-stage reconstruction of the phallus.
Cleft Rhinoplasty: Combining Erich open Rhinoplasty with the Dibbell and Tajima Techniques

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Abstract:
Objectives: To determine the post-operative results in terms of patients’ and surgeon’s satisfaction of the combined Erich open rhinoplasty with the Dibbell and Tajima techniques.
Place and duration of the study: This study was performed in the department of Plastic & Reconstructive Surgery, PGMI Hayatabad Medical Complex Peshawar, Pakistan and Al-Shifa Healthcare Centre Peshawar, Pakistan.
Study design: Descriptive cross-sectional study.
Material & Methods: All the patients presenting for the secondary cleft rhinoplasty irrespective of their gender with the age above 12 years were included in the study. Those patients who had a nasal correction at the time of lip repair were excluded from the study. After informed consent, Erich open rhinoplasty combined with Dibbell and Tajima techniques was performed in all the patients. All the data were recorded in a proforma constructed with the help of a statistician. The data was analysed with help of a Statistical Package for Social Sciences version 17 (SPSS 17). The post-operative outcome was divided into good, average and poor on the basis of patients’ and surgeon’s satisfaction. The results were expressed in the form of tables and figures.
Results: A total of 21 patients including 15 (71.42%) male patients and 6 (28.57%) female patients were included in the study. As a whole the frequency of good post-operative result was observed in 66.6% (n=14). The individual good post-operative results in male and female patients were 60% (n=10) and 66% (n=04) respectively.
Conclusion: Being a complex anomaly, cleft lip nasal deformity correction requires a considerable surgical experience. The combination of open rhinoplasty with Tajima and Dibbell techniques is a safe and reliable method of correction of secondary cleft nasal deformities with low revision rates.

Key words: Cleft lip nasal deformity, cleft lip, rhinoplasty.

Introduction;
Cleft lip nasal deformity offers a unique challenge to the reconstructive surgeons for many reasons. Firstly the clinical presentation of cleft lip varies. Secondly deformity being asymmetrical makes surgical correction difficult. Thirdly, patients with cleft lip may have been previously subjected to numerous procedures with a significant scar tissue on the operation site. Fourthly, the timing of rhinoplasty whether synchronous or staged with cleft lip repair is controversial. Lastly the growth in the paediatric population with cleft nasal deformity has some effect on the outcome. Conversely the surgery may adversely compromise the nasal growth. Correction of the secondary nasal deformity is really a challenging job for surgeons. The severity of the nasal deformity depends upon the initial deformity of the nose, extent of primary correction of the nose at the time of lip repair and the width of the cleft lip. It is now a general trend to correct cleft lip nasal deformity at the time of the lip surgery. A few decades ago most of the surgeons considered that repair of the cleft nose will interfere with mid-face growth. In 1963, Limberg described his technique for closing the unilateral cleft lip with correction of the associated nasal deformity. In 1985, Mc Comb published his 10 years results and showed that the early nasal correction does not interfere with nasal growth. It is believed that the greatest advance in cleft lip nasal correction is the nasal alveolar moulding (NAM). Grayson and colleagues described a technique for NAM which
is further refined and modified by Liou EJ. NAM helps in approximating the alveolar cleft and the alar cartilage and increase the length of the columella on the cleft side. In spite of all these efforts there is still residual nasal deformity in patients with cleft lip which needs secondary surgery to further modify the aesthetic appearance of the nose. Few years later after the primary cleft lip nasal correction, there are a number of factors which play an important role to exhibit the nasal deformity e.g. scar formation, growth in the facial skeletal and soft tissue structures. The natural anatomical development results in certain nasal deformities which justify the secondary rhinoplasty. Some of these changes include:

1. Shortened columella
2. Retro displacement of the dome on the cleft side.
3. Loss of tip definition
4. Alar collapse on the cleft side
5. Alar notching on the cleft side
6. Buckling of the lower lateral cartilage on the cleft side

A limited rhinoplasty is now regularly performed by most of the plastic surgeons at the time of primary lip repair and it involves only dissection and medical mobilization of the cleft lower lateral cartilage. There are data demonstrating that the nasal growth is complete at the age of 13 years in girls and 14 years of age in boys. Surgical correction of secondary cleft lip nasal deformities is mandatory after completion of nasal growth and it should be according to the severity of these deformities.

In this series we included only those patients who underwent an Erich open rhinoplasty with Dibbell and Tajima techniques. A total of 21 patients were included in the study according to the selection criteria. Among them 6 patients were females and 15 were males. Four patients were excluded from the study because they had a history of primary nasal correction at the time of lip surgery.

We performed Erich open rhinoplasty technique combined with Dibbell and Tajima techniques. An inverted U shaped incision over the columella was used. A Tajima inverted U shaped incision was made on the cleft side over the dorsum of the nostril and inside the ala and the inverted U incision was designed similar to the nostril shape on the non-cleft side. The nose was opened after subcutaneous undermining between skin and cartilage. Once the domes were fully exposed, the Dibbell incision was made across the nasal floor. The medial crus of the lower lateral cartilage was cut at the lower end and the lower lateral cartilage was fully mobilized on the cleft side. The domes were approximated by putting interdomal sutures.

The medial crura of both the lower lateral cartilage were stitched together with 5/0 polypropylene suture. The alar base was then dissected from the underlying bone and the alar base was placed into normal position by putting a stich in the periosteum of the anterior nasal spine. After tip correction the rhinoplasty incision was closed. The inferior skin flap of the Tajima incision was then marked, trimmed and closed. This created the soft triangle. All the patients had pre-operative and post-operative photographs (Frontal and worms eye view) taken. The post-operative results were classified into three groups as good, average and poor as described in table I.

Material and methods:

This study was conducted in the department of Plastic and Reconstructive Surgery, Hayatabad Medical Complex Peshawar and Al-Shifa Healthcare Centre Peshawar, Pakistan. A single surgeon performed secondary cleft rhinoplasty in 25 patients. Patients eligible for inclusion in the study were older than 12 years and had no or limited previous nasal correction with lip repair. Those patients who had a nasal correction at the time of lip repair, below 12 years and syndromic were excluded from the study.

Results:

The total numbers of patients included in the study were 21 and among them 15 were males and 6 were female. In male we achieved good results in 60% of patients and in female we achieved good results in 66% patients. Poor results observed in 13% male patients only.
TABLE I: POST-OPERATIVE RESULTS ASSESSMENT CLASSIFICATION

<table>
<thead>
<tr>
<th>S/N</th>
<th>Category</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good</td>
<td>Both the patients and the surgeon are satisfied with the surgical outcome. Patient is happy with the results.</td>
</tr>
<tr>
<td>2</td>
<td>Average</td>
<td>Results but surgeon is not satisfied with the aesthetic outcome and vice versa. Both the patient and surgeon are not satisfied with the results.</td>
</tr>
</tbody>
</table>

TABLE II: POST-OPERATIVE RESULTS IN THE PATIENTS UNDERGOING COMBINED ERICH OPEN RHINOPLASTY WITH THE DIBBELL AND TAJIMA TECHNIQUES

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>1466.66%</td>
</tr>
<tr>
<td>Average</td>
<td>0523.80%</td>
</tr>
<tr>
<td>Poor</td>
<td>029.52%</td>
</tr>
<tr>
<td>Total</td>
<td>01100%</td>
</tr>
</tbody>
</table>

Discussion:
Secondary nasal deformity associated with cleft lip is a difficult surgical task. Since time immemorial numerous surgical methods have been created to address the structural changes that occur over time following primary surgery. Because the presenting patients with cleft lip nasal deformity are young, the surgical plan must account for patient growth and surgical scarring. The challenges posed by secondary unilateral cleft lip nasal defects have spurred the recent advent of various surgical techniques and the use of autogenous and alloplastic material to correct the structural and supportive deficiencies.
Although a wide variety of alloplastic materials have been used historically and they still have a place in nasal surgery the ideal implant has strict requirements concerning biocompatibility, plasticity, stability of form, resistance to infection and removability. The most commonly used alloplastic materials used are silicone, expanded polytetrafluoroethylene (Gore-Tex) and porous high density polyethylene (Medpore) with intent to circumvent the short-comings of autogenous tissue materials. Silicone implants although relatively inert do not become integrated into recipient tissues making them prone to extrusion. There are frequent reports of rejection, infection and bone resorption. Polyamide undergoes severe hydrolytic degradation of bulk and has been associated with severe inflammatory reaction. Limited use of Gore-Tex is attributed to its inability to maintain an exact shape or provide...
support. Medpore may offer many advantages in terms of host tissue tolerance, easy manipulability and demonstration of host tissue ingrowth but still carry a removal rate of 3.1% as compared to silicone which has significantly higher of 6.5%. Proplast is often used in its place. All these great variety of alloplastic materials are available but there high cost, poor tissue tolerance and infection limits there use. Moreover, many patients are not suitable for or do not agree to the use of alloplastic materials. The combination of Erich open rhinoplasty with Dibbell and Tajima techniques will correct most of the secondary cleft nasal deformities. Some of the plastic surgeons use autogenous cartilage grafts or alloplastic material in the form of columella struts or for tip augmentation. In our series the pre-operative and post-operative photographs were assessed which showed good aesthetic improvements in 60% of the male patients and 66% in the female patients. Poor results observed in 13% male patients only. We believe that the achievement of good aesthetic results in secondary cleft rhinoplasty depends upon a number of factors as below:

1. Selection of the patients: It is very important to perform the secondary cleft rhinoplasty when the nasal growth is complete at the age of 11-12 years in females and 13-14 years in male patients.

2. Pre-operative assessment of deformity: It is important to assess the external and internal nasal structures. Pre-operative assessment of any functional problem is also mandatory and will need correction at the time of secondary cleft rhinoplasty.

One of the cleft nasal deformities is the descent of the lower lateral cartilage on the cleft side. This deformity will lead to obliteration of the soft triangle and causing a nostril apex overhang. The inverted U Tajima incision will create a soft triangle so a combination of open rhinoplasty with the Tajima and Dibbell technique will address all the visible deformities of the cleft nose.

With open rhinoplasty approach we have a good exposure of the domes. So accurate reconstruction and precise placement of sutures in the domes and correction of the nasal tip disparities in cleft nose is possible with the technique. Several authors reported the use of autogenous cartilage grafts.

In secondary cleft rhinoplasty, because the lower lateral cartilage in the cleft patients tends to be floppy, we did not use any cartilage grafts in our series. We observed that the lower lateral cartilage in our population are thick and needs only repositioning in the majority of cases so we prefer to use the suture technique which provides adequate support to maintain the cartilage in correct and desired anatomical position.

Conclusion:
Cleft lip nasal deformity is a complex anomaly and its correction requires a considerable surgical experience. Thorough understanding of the magnitude of the deformity and various techniques of its repair allows a successful correction. The combination of open rhinoplasty with Tajima and Dibbell techniques is a safe and reliable method of correction of secondary cleft nasal deformities with low revision rates.

References:
5. McComb HK, Coghlan BA. Primary repair of the unilateral cleft lip nose: completion of a longitudinal
Case Report

Total ear reconstruction with prefabricated radial forearm flap using salvaged ear cartilage

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SUMMARY. There are numerous techniques for total ear reconstruction, either for microtia or for post-traumatic complete amputation, and are well described in the literature. Best results although are achieved with successful replantation of the whole amputated ear but the results with classical two stage total ear reconstruction are usually also more than just a mere satisfaction. We report a case of a seven year old boy with an AV malformation of Right ear needing surgical intervention. To ensure the complete removal of the tumor an elective total amputation of the ear was done. The native cartilage skeleton was salvaged and was banked subcutaneously in the left forearm to prefabricate a composite radial forearm free flap for the later on total ear reconstruction. Six months later, after confirming the successful ablation of the tumor, total ear reconstruction was performed with transfer of prefabricated composite radial forearm free flap. Postoperative flap edema took three months to subside revealing an improved contour definition of the embedded cartilage skeleton. The final result was satisfactory for the patient and his parents.

Keywords: forearm replantation, revascularisation, limb reconstruction

Gillies first described total ear reconstruction in 1920, with a carved costal cartilage placed under the scalp skin. Tanzer modified the procedure into stages. Brent further improved the techniques into the state of the art procedure. Ear can be reconstructed with other methods, but results are usually below satisfaction. In cases of traumatic loss of ear the results are more frequently successful on both extremes of the injury i.e. small size amputated fragments have more chances of being salvaged by simple reattachment as a composite graft. Similarly large amputated segments or total ear amputates, with suitable vasculature, have equally better chances of successful microvascular replantation. Numerous procedures are described in literature to improve the chances of successful outcome. Some authors propose use of the retroauricular tissue pocket principle; others prefer the use of either a pedicled or a microvascular free flap, first as an embedding site and then as a carrier latter on; and others suggest a standardization of procedure.

We are reporting the case of total ear reconstruction. The ear was excised electively as a therapeutic procedure and the cartilage skeleton was embedded in the forearm to prefabricate a composite radial forearm microvascular free flap. It was subsequently transferred to its original site in order to reconstruct the ear.

Case Report

A seven year old boy was referred to our department for the management of a large A-V malformation of Right ear. Clinically and on investigations the tumour was involving entire external ear (Fig.1A).

Indications for intervention were recurrent ulceration leading to episodes of profuse bleeding, increasing size and the eroding nature of the tumour that was progressively deforming the auricular cartilage skeleton. It was planned to amputate the external ear in-Toto, so as to ensure the complete removal of the tumour, and then to bank the cartilage skeleton for delayed total ear reconstruction, Figure.1B. The tumour was resected en-block, the cartilage skeleton was denuded and reduced in size to approximate the normal ear. It was then banked subcutaneously, between fascia and skin, in the distal half of the left forearm, Figure.1C. The defect at operation site was closed primarily with local scalp advancement flap.
Six months later, after confirming the complete removal of tumour, it was decided to proceed for the second stage ear reconstruction. A prefabricated radial forearm free flap, including the embedded salvaged auricular cartilage skeleton, was raised and transferred to the Right auricular area. Microvascular anastomoses were done in the neck, end to side between the radial artery and the external carotid artery and end to side between the cephalic vein the external jugular vein, Figure.1D.

The patient remained in the hospital for one week postoperatively with an uneventful stay. Due to the flap oedema the details of the cartilage skeleton remained obscured for a month or so which improved subsequently with the passage of time, Figure.1E. Secondary surgery was not performed on wish of the patient and his parents, as they are satisfied with the result.
Discussion

The concept, of in transient embedding of amputated but otherwise undamaged body fragments for later on transfer to the original site, has been described in literature. It has also been proposed in literature to use a prefabricated composite free flap, including the embedded auricular cartilage, for ear reconstruction in the case of trauma.

In this era, the most commonly done procedure for ear reconstruction involves the use of autologous costal cartilage being carved as auricular framework. In our case, we took the opportunity to utilize the native cartilage framework, of excised ear for reconstruction. In this way we managed to conserve a normal body segment that would have been otherwise discarded.

We used the radial forearm free flap that has some advantages beside its role as carrier and skin cover. This flap has thin pliable skin with good color and texture match for the ear. It has a pedicle with large diameter and it can be raised with adequately long pedicle.

We had the option of using autologous costal cartilage but that would have amounted to more donor site morbidity. Most importantly that procedure requires healthy and normal skin in the temporoparietal auricular area for cartilagenous skeleton insertion, which was not available in our case.

The results, with radial forearm flap, can be improved with some modifications such as prior thinning of forearm skin with tissue expander, bolus suturing of cartilage with overlying skin upon insertion or utilization of forearm fascia alone. Contralateral temporoparietal fascia wrapped around cartilage skeleton can also be used as free flap for this kind of total ear reconstruction.

References


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Vacuum Assisted Closure (VAC) in Children

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Introduction: VAC, initially described by Argenta in 1997, has been reported in the adult literature as a novel method of accelerating wound healing. However, a few reports exist about the use of VAC therapy in children. The VAC therapy consists of the use of an open-cell foam, sealing with an adhesive drape, and sub atmospheric pressure, usually at 125 mmHg. VAC promotes wound healing by removing localized oedema, reducing bacterial density, promoting angiogenesis, and by increasing the formation of granulation tissue.

The VAC has been used in paediatric patients in a variety of wounds arising from congenital defects, trauma, infection, tumours, burns, pressure ulceration and post surgical complications. VAC therapy is now an accepted treatment modality for acute and chronic wounds in adults. The VAC therapy should not be applied over non-healing ulcers, diabetic ulcers, untreated osteomyelitis, or direct over vital structures such as tendons, ligaments, nerves, and large blood vessels.

Materials and Methods:
The study was conducted in a private setup from 2006 to 2010. All the patients of age less than 12 years of either sex were included. A careful history was taken especially about the cause of the injury. The site of wounds was noted. The initial size of the wounds was also noted.

Application of VAC:
The VAC device consisted of a double layer of ½ inch thick open cell foam into which was embedded an evacuation tube of 16 or 18 Fro. The tube was connected to a 5-ml syringe. The tube from collection container of vacuum pump was placed inside the syringe. The foam was soaked with Pyodine® and trimmed to fit the dimensions of the wound, and was applied in direct contact with the base of the wound. Pre-op drapes (Opsite®) were used extending 3-5 cm beyond the margins of the wound to create an airtight seal (Fig. 1). For 1st 24 hours, 125-150 mmHg of continuous negative pressure was applied and then continued with intermittent pressure cycles of 20 minutes ON and 40 minutes OFF for the next 24 hours. After 48 hours, the VAC dressing was changed. The wound was washed thoroughly with normal saline and VAC was re-applied in most cases at bedside. The same routine was continued until a satisfactory clean, granulating wound bed was obtained for the definitive procedure (skin graft or flap). Data were collected using a pre-designed proforma. Demographic information collected includes age, sex and co-morbid condition. Information noted for wound includes size before and after application of VAC, site and etiology of the wound. Mean, frequency, ratio and percentages were calculated and data were inferred also in the form of tables using Microsoft Excel.

Results:
A total of 32 patients were included in the study. Majority of the patients (53.1%) were males with a female to male ration of 1:1.3. The mean age of male patients was 9.4 years (range, 5 – 12 years) as compared to 9.6 years (range, 7 – 12 years) in female patients. Most of the patients (46.9%) had the wounds due to road traffic accident. Burns constituted about 37% (Table 1). Foot was the most frequently affected area (40.6%) followed by hands (Table 2). The average size of the wounds was 17.93 cm². The average number of VACs was 4.4 in male patients and 4.8 in female patients. The mean size of the wounds at the end of the therapy was 7.67 cm². The average hospital stay was 19.4 days in male patients as compared to 15.3 days in female patients. Split-thickness skin grafting was done in majority of the cases (Table 3). A very few complications were also observed which included partial loss of skin graft in one case and complete loss of skin graft in one case only.
**Case 1:**
A nine years old child had a foot injury due to entrapment in the motorcycle wheel. He had a large wound on right foot (Fig. 2A). The wound was debrided and VAC was applied (Fig 2B & C). Later skin grafting was performed (Fig 2D).

**Discussion:**
There have been few reports about the use of VAC in children. The mean age in the present study was 9.4 years and 9.6 years in male and female patients respectively which is almost similar as noted in other studies. We included the patients having wide range of cases; however, we did not encounter any case of fistula, pilonidal sinus, sternal wound as noted in other studies.

We strictly changed the dressings after 48 hours. The average number of VAC was 4.4 and 4.8 in male and female patients respectively. Whereas the mean hospital stay was 17.5 days which is similar to the observation noted in other studies. The average size of wound was 17.93 cm² at the start of the therapy which decreased to 7.67 cm² at the end of the therapy, thereby decreasing more than half of the original size.

Unlike Caniano et al, we did not apply VAC intraoperatively rather on the 2nd or 3rd day after the initial wound debridement. Another different point in the present study from all other studies was the use of vacuum machine. We used the locally available vacuum machines, not the branded ones. This helped in reducing the cost of the treatment, thus lessening the financial burden on the parents/guardians.

VAC has also been described for closure of dehisced wounds, in sternum, abdomen, extremities and back. VAC is more cost-effective than daily dressings. In the study carried out in Canada, the cost of VAC was found to be almost 50% less than the traditional therapy for wound management.

**Conclusion:**
VAC offers many advantages in children. Fewer dressing changes result in increases inpatients comfort and rapid recovery enables children to rapidly return to their daily activities.

**References:**


**Table 1: Aetiology**

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<th>Cause</th>
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<th>Females</th>
</tr>
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<tr>
<td>Road traffic accidents</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Burns</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Home accidents</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Chronic wounds/Fistula</td>
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<td>1</td>
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</table>

**Table 2: Areas involved**

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<th>Females</th>
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<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Leg</td>
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<td>2</td>
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<td>Arm</td>
<td>2</td>
<td>1</td>
</tr>
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<td>Hand</td>
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<td>3</td>
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<tr>
<td>Back</td>
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<td>1</td>
</tr>
<tr>
<td>Head</td>
<td>1</td>
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</tr>
<tr>
<td>Abdomen/Chest</td>
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**Table 3: Operative Modalities**

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<tr>
<th>Operative modality undertaken</th>
<th>Patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split-thickness skin grafting</td>
<td>21</td>
<td>65.6</td>
</tr>
<tr>
<td>Full thickness skin grafting</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>Local flaps</td>
<td>4</td>
<td>12.5</td>
</tr>
<tr>
<td>Distant flaps</td>
<td>4</td>
<td>12.5</td>
</tr>
</tbody>
</table>

Fig. 1: Application of VAC

Fig. 2: Graph showing the number of patients treated per year with V.A.C. system.

Fig. 3: Pre-operative and post-operative photographs of a child having foot injury.
Instruction to Authors

All material submitted for publication should be sent exclusively to the Journal of the College of Physicians and Surgeons, Pakistan. Work that has already been reported in a published paper or is described in a paper sent or accepted elsewhere for publication should not be submitted. Multiple or duplicate submission of the same work to other journal should be avoided as this fall into the category of publication fraud and are liable for disciplinary consequences, including reporting to Pakistan Medical & Dental Council and Higher Education Commission. A complete report following publication of a preliminary report, usually in the form of an abstract, or a paper that has been presented at a scientific meeting, if not published in full in a proceedings or similar publication, may be submitted. Press reports of meetings will not be considered as breach of this rule, but additional data or copies of tables and illustrations should not amplify such reports. In case of doubt, a copy of the published material should be included with a manuscript to help the editors decide, how to deal with the matter. Authors can submit their articles by post or by E-mail: publications@cpsp.edu.pk to the Managing Editor, Journal of the College of Physicians and Surgeons Pakistan. Article can also be submitted by post or by hand on a Compact Disc (CD) with three hard copies (laser copies or inkjet, photocopies are not accepted). Articles submitted by E-mail do not require any hard copy or CD. Numbers, including mobile phone number of the corresponding author), abstract, key words, text, references, tables (each table, complete with title and footnotes) and legends for illustrations and photographs. Each component should begin on a new page. The manuscript should be typed in double spacing as a single column on A4 (8-1/2" x 11" or 21.5 cm x 28.0 cm), white bond paper with one inch (2.5 cm) margin on one side.

Material for Publication.

The material submitted for publication may be in the form of an Original research (Randomized controlled trial - RCT, Metaanalysis of RCT, Quasi experimental study, Case Control study, Cohort study, Observational Study with statistical support etc), a Review Article, Commentary, a Case Report, Recent Advances, New techniques, Debates, Adverse Drug Reports, Current Practices, Clinical Practice Article, Short Article, KAP (Knowledge, Attitudes, Practices) study, An Audit Report, Evidence Based Report, Short Communication or a Letter to the Editor. Ideas and Innovations can be reported as changes made by the authors to an existing technique or development of a new technique or instrument. A mere description of a technique without any practical experience or innovation will be considered as an update and not an original article. Any study ending four years prior to date of submission is judged by Editorial Board for its suitability as many changes take place over the period of time, subject to area of the study. Studies more than four years old are not entertained. JCP CP also does not accept multiple studies/multiple end publications gathered/derived from a single research project or data (wholly or in part) known as ‘salami slices’.

Original articles should normally report original research of relevance to clinical medicine. The original paper should be of about 2000-2500 words excluding abstract and references. It should contain a structured abstract of about 250 words. Three to 10 keywords should be given for an original article as per MeSH (Medical Subject Headings). There should be no

General archival and linguistic instructions.

The author should submit the manuscript typed in MS Word. Manuscripts should be written in English in British or American style/format (same style should be followed throughout the whole text), in past tense and third person form of address. Sentences should not start with a number or figure. Any illustrations or photographs should also be sent in duplicate. Components of manuscript should be in the following sequence: a title page (containing names of authors, their postal and Email addresses, fax and phone...
more than three tables or illustrations. The data should be supported with 20 to 25 references, which should include local as well as international references. Most of the references should be from last five years from the date of submission.

Clinical Practice Article is a category under which all simple observational case series are entertained. The length of such article should be around 1500 - 1600 words with 15 - 20 references. The rest of the format should be that of an original article. KAP studies, Audit reports, Current Practices, Survey reports and Short Articles are also written on the format of Clinical Practice Article. Evidence based reports must have at least 10 cases and word count of 1000-1200 words with 10 - 12 references and not more than 2 tables or illustrations. It should contain a non-structured abstract of about 150 words. Short communications should be of about 1000 words, having a nonstructured abstract of about 150 words with one table or illustration and not more than five references. Clinical case reports must have of academic and educational value and provide relevance of the disease being reported as unusual. Brief or negative research findings may appear in this section. The word count of case report should be 1200-1500 words with a minimum of 3 key words. It should have a non-structured abstract of about 100-150 words (case specific) with maximum of 10 references.

Review article should consist of critical overview/analysis of some relatively narrow topic providing background and the recent development with the reference of original literature. It should incorporate author's original work on the same subject. The length of the review article should be of 2500 to 3000 words with minimum of 40 and maximum of 60 references. It should have non-structured abstract of 150 words with minimum 3 key words. An author can write a review article only if he/she has written a minimum of three original research articles and some case reports on the same topic.

Letters should normally not exceed 400 words, with not more than 5 references and be signed by all the authors-maximum 3 are allowed. Preference is given to those that take up points made in contributions published recently in the journal. Letters may be published with a response from the author of the article being discussed. Discussions beyond the initial letter and response will not be entertained for publication. Letters to the editor may be sent for peer review if they report a scientific data. Editorials are written by invitation. Between 3 to 10 key words should be given for all the category of manuscripts under the abstracts as per mesh [medical subject heading].

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